PM-2.5 and 8-hour Ozone Standards Update

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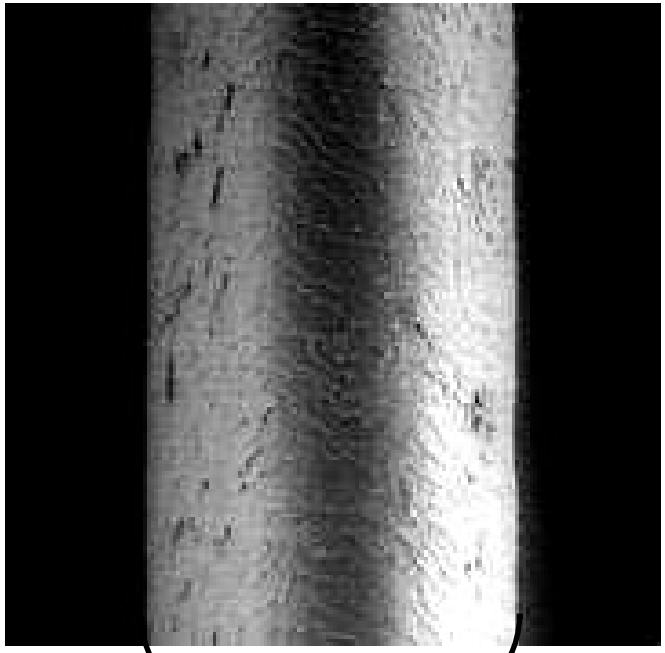
PM-2.5 Overview

- PM-2.5
  - Characteristics, sources, health and environmental effects
- 1997 PM-2.5 Standards
- Monitoring Data
- Regulatory Schedule
- Key Issues

Fine Particles in the Air

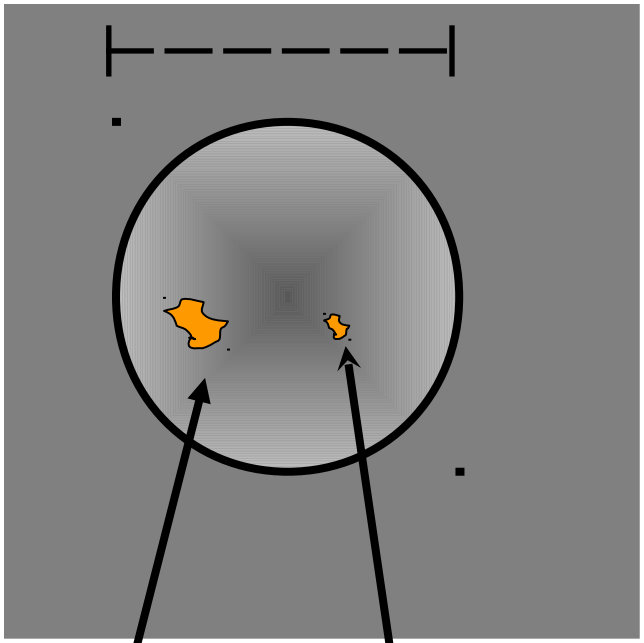
Particulate Matter: What is It?

Particulate matter is a complex mixture of extremely small particles and liquid droplets



Human Hair (70 µm diameter)

Hair cross section (70



EPA's Role: Protecting and Improving Air Quality

- EPA set national air quality standards for fine particles in 1997
  - Daily standard, 65 $\mu g/m^3$
  - Annual standard, 15 $\mu g/m^3$
- New standards withstood all legal challenges; U.S. Supreme Court upheld
- EPA moving forward to implement standards

Fine Particles: Why You Should Care

Particles Affect the Lungs …

- Respiratory system effects
  - Chronic bronchitis
  - Asthma attacks
  - Respiratory symptoms (cough, wheezing, etc.)
  - Decreased lung function
  - Airway inflammation

… and the Heart

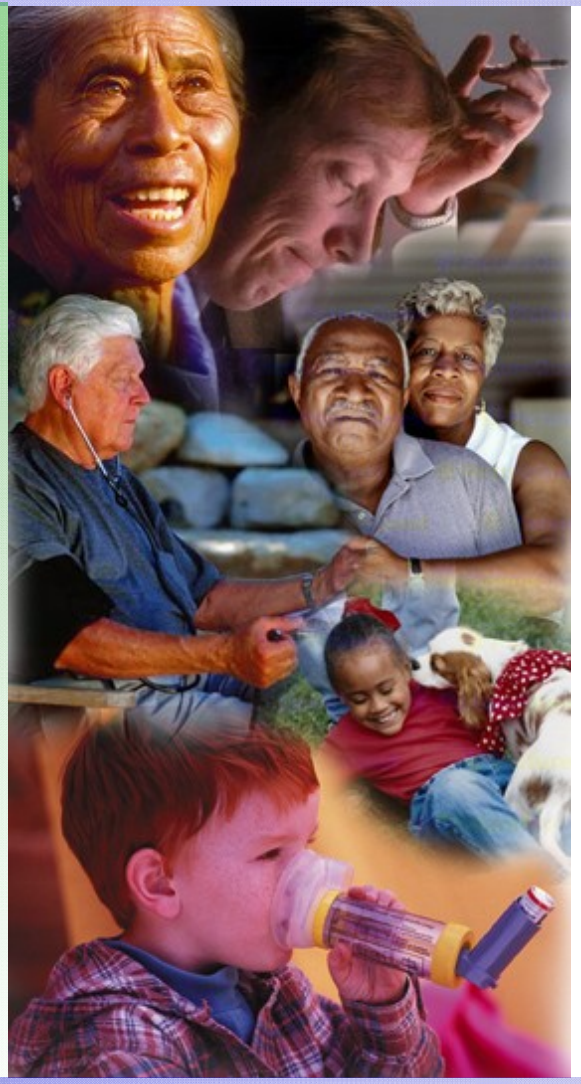
- Cardiovascular system effects
  - Heart attacks
  - Cardiac arrhythmias
  - Changes in heart rate and heart rate variability
  - Blood component changes

Public Health Risks Are Significant

Particles are linked to:

- **Premature death from heart and lung disease**
- **Aggravation of heart and lung diseases**
  - Hospital admissions
  - Doctor and ER visits
  - Medication use
  - School and work absences
- **And possibly to**
  - Lung cancer deaths
  - Infant mortality
  - Developmental problems, such as low birth weight in children

Some Groups Are More at Risk



- People with heart or lung disease
  - Conditions make them vulnerable
- Older adults
  - Greater prevalence of heart and lung disease
- Children
  - More likely to be active
  - Breathe more air per lb.
  - Bodies still developing

Fine Particles Can Be Emitted Directly or Formed in the Air from Gases

Primary Emission Sources

- Area Sources
  - Paved and unpaved roads
  - Construction activities
  - Open or prescribed burning
- Point Sources
  - Metals processing (smelters, iron & steel, etc.)
  - Mineral products (cement stone quarrying)
  - Utility and industrial combustion (soot, flyash)
  - Waste disposal and recycling
- Mobile Sources
  - Highway vehicles (diesel) off-road vehicles (lawn & garden equipment)

Secondary Emission Sources

- SOx - Fuel combusion (utilities, industrial); industrial processes (smelters, iron & steel manufacture, oil refining, etc.)
- NOx - Combustion sources (utilities, industrial); mobile sources (highway & off-road engines)
- VOC - Mobile sources, biogenic sources, evaporation (solvent & fuel), residential wood combustion
- Ammonia (NH3) - Waste from animal husbandary, fertilizer application

Some Local Reduction Programs

- **Making vehicles cleaner**
  - Diesel engine retrofit programs
  - Clean vehicle fleet programs
  - Programs to reduce diesel idling
  - Smoking cars
- **Reducing the impact of burning**
  - Wood stove retrofit incentives
  - Open burning impact reduction
- **PM Action Days**

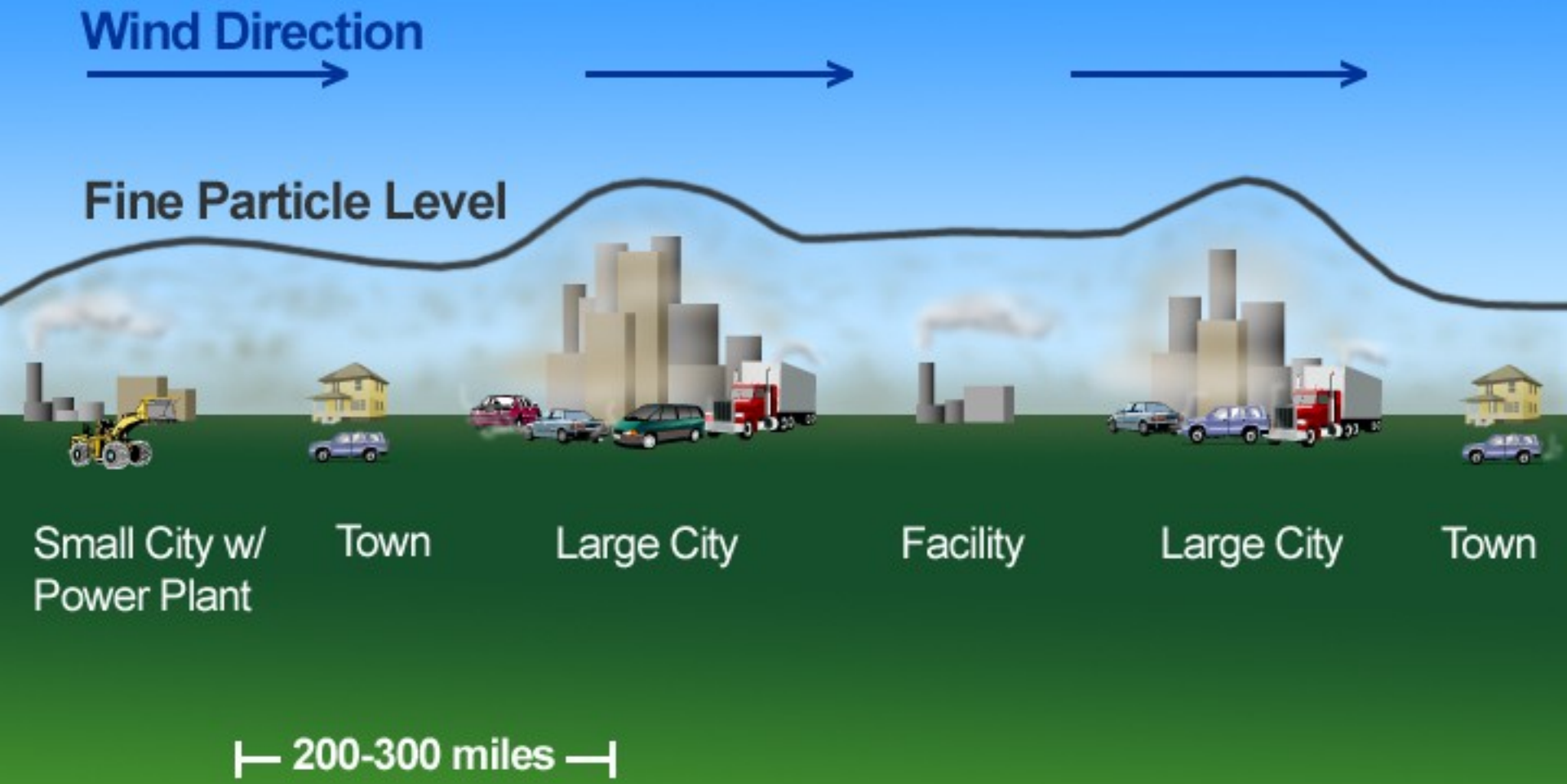
Environmental Effects

- Reduced visibility
  - Across country
  - National parks
- React w/ moisture
  - Acid rain
  - Other acidic pollution
- Damage to paint/building materials
- Damage to vegetation/crops

Fine Particles Reduce Visibility

- Example: Chicago in the summer of 2000
  - Left – a clear day: PM 2.5 < 5 µg/m^3
  - Right – a hazy day: PM 2.5 ~ 35 µg/m^3

Particles May Be Transported Long Distances And Impact Large Numbers Of People



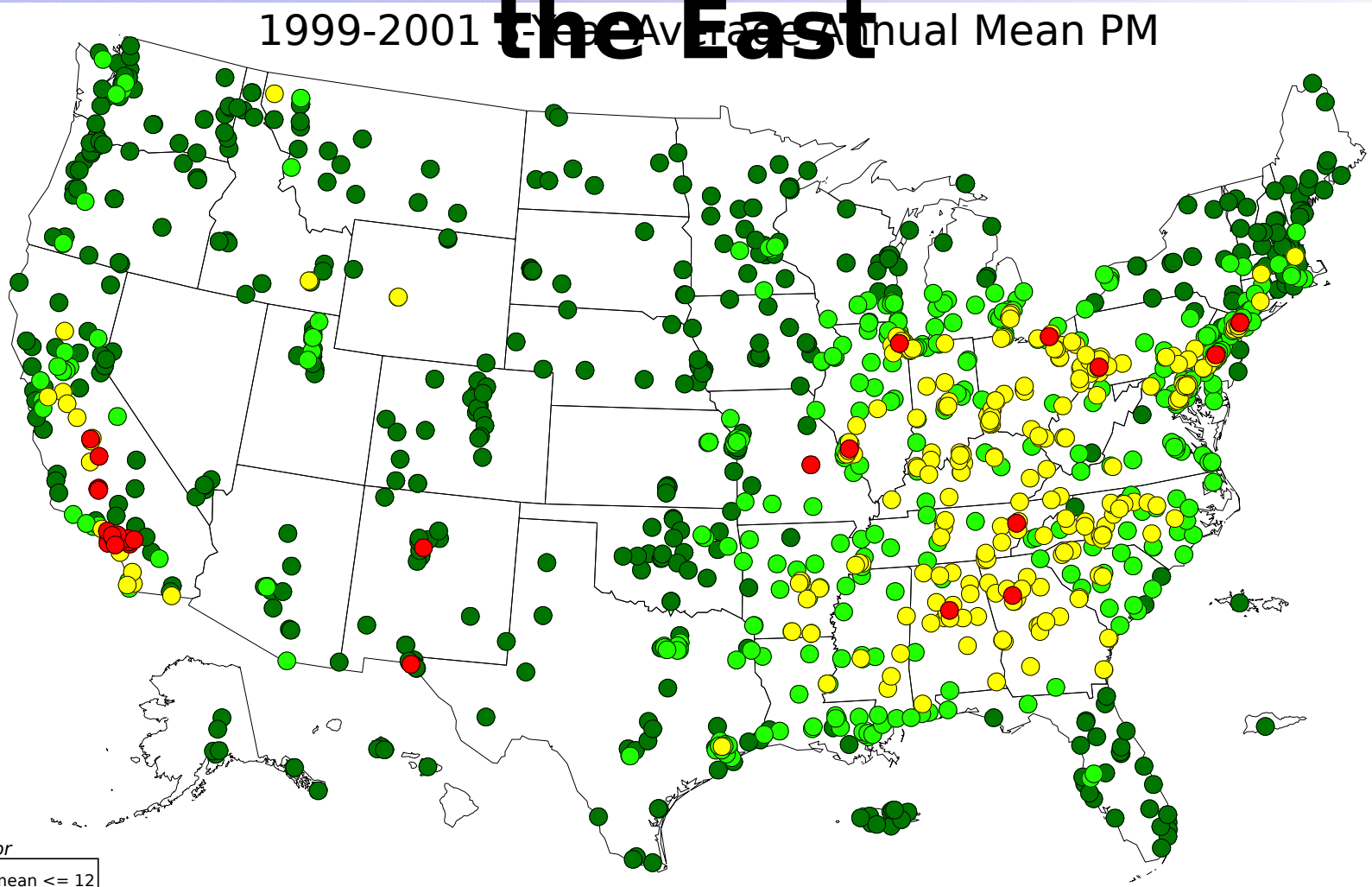
Many Areas Are at Risk

- Fine particles can be transported long distances
- Fine particle pollution is a regional problem
- Eastern U.S. and California are the most affected
- Fine particles are a year-round problem

Overview of Monitoring Data

- Data from PM-2.5 Monitors, 1999-2001
- 198 monitors in 130 counties not meeting standard
- That means 65 million people exposed to unhealthful levels of PM-2.5
- California has the greatest number of people exposed of any State
- Fine particles are also a significant problem in the eastern States

Fine Particles are a Significant Problem in California and in the East



Data from AQS 7/8/02. Sites that operated any time, 1999-2001 (n= 1202).

With Substitution

Reducing Fine Particles

- Multi-faceted approach must include national, regional and local strategies
- National efforts under way:
  - Existing programs such as Acid Rain program, new tailpipe standards and fuel sulfur limits
  - Rules not yet in effect, such as rule to control emissions from non-road vehicles & equipment

EPA Also Developing A Regional Transport Rule

- Regional reductions critical
- EPA has authority to begin developing the rule now
- Rule likely to address power plants and industrial sources

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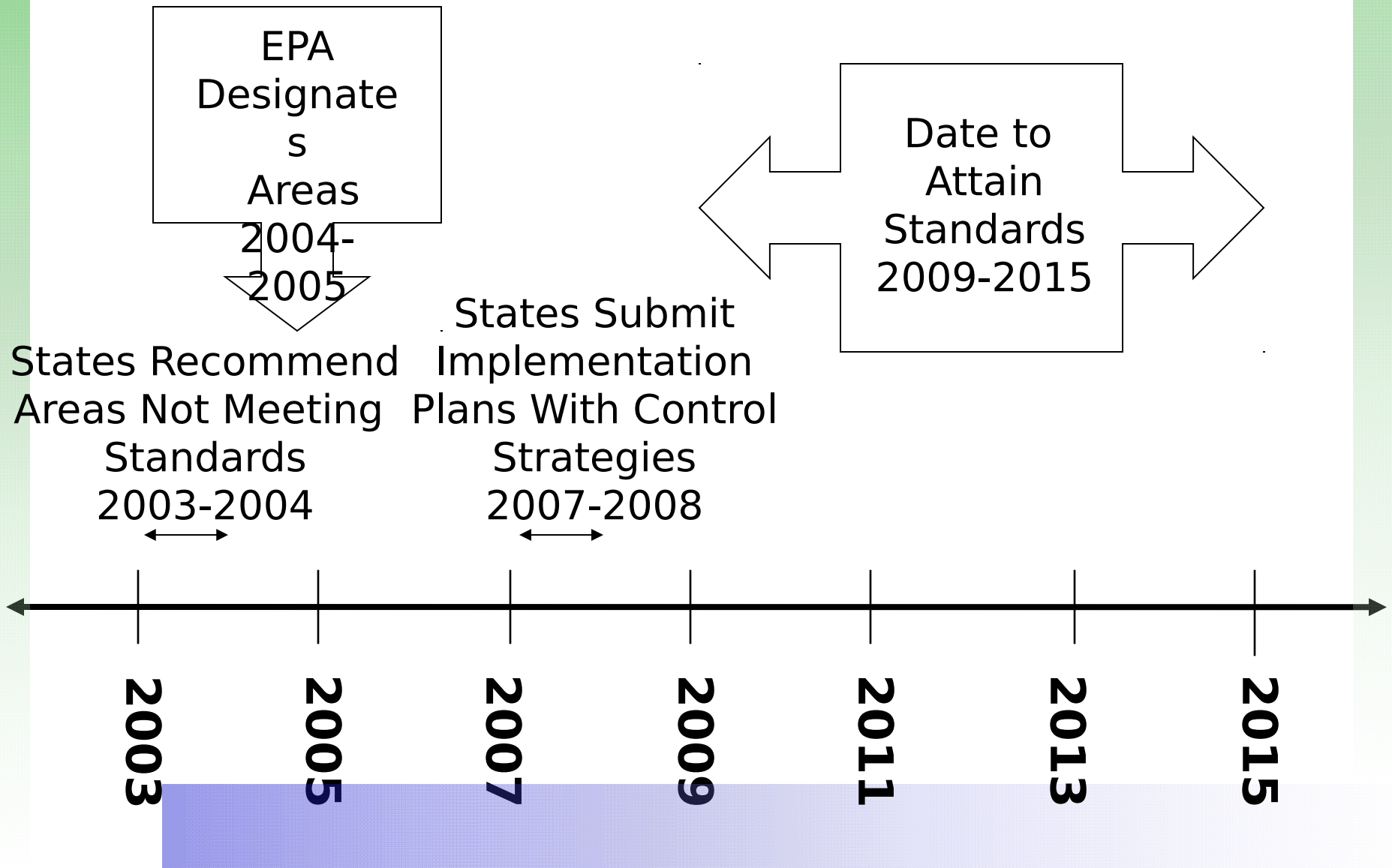
Moving Forward to Implement Fine Particle Programs



Implementation Issues

- Designations, Classifications and Attainment Dates
- Meeting requirements of CAA (Subpart 1)
  - Reasonably Achievable Control Measures (RACM)
  - Reasonable Further Progress (RFP)
  - New Source Review (NSR)
  - Contingency Measures
- Conformity
- Transport
- Harmonize PM-2.5, 8-hr Ozone, RH

Fine Particles: Summary

- Linked to serious health effects
  - premature death, heart and lung disease
- A complex problem
  - many types of pollutants from multiple emission sources
- EPA encourages early reductions
- EPA will work with states to meet the fine particle standards and to protect public health

8-hr Ozone Standards Update

USAF Air Workshop
November 21, 2002

Background

- In 1997, based on health studies, EPA revised the standard for ozone from 0.12 ppm on a 1-hour average, to 0.08 ppm on an 8-hr average
- The revised standard was subjected to court litigation, appeals going as high as the U.S. Supreme Court
- EPA now moving forward with implementing the new standard

What is Ozone?

- Unstable oxygen molecule
- Good up high, bad nearby
- Sources
  - Mobile
  - Stationary

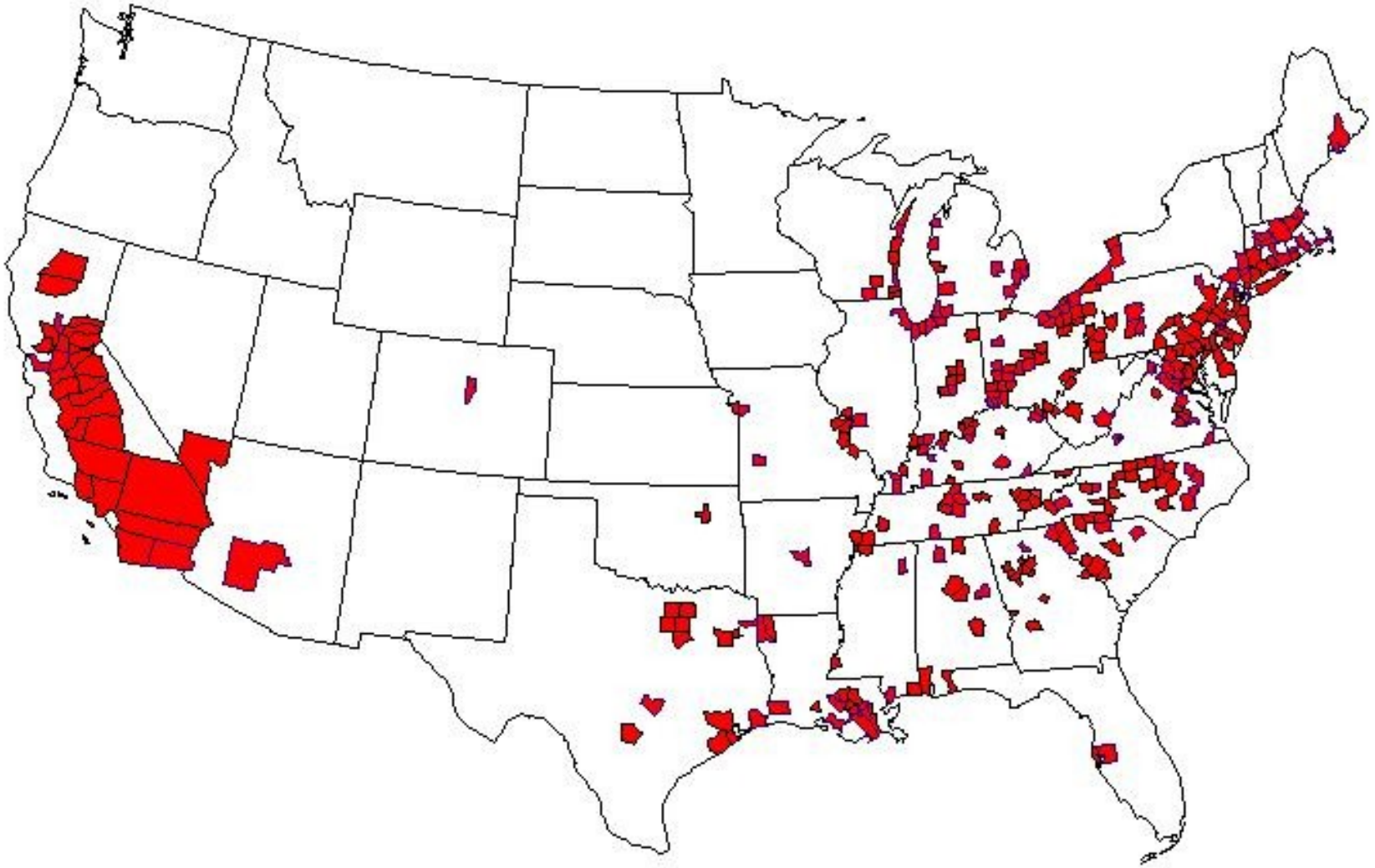
Health Effects

- Significant new findings, based on hundreds of studies
- Causation of asthma
- Ozone implicated in
  - Hospital admissions, children <2 yrs
  - >elementary school absence
- Contributes to premature mortality and decreased quality of life

Geographic Extent

- Based on data covering 1998 to 2000…
  - Wide geographic areas have unhealthy levels of ozone
  - Much of eastern U.S. and large parts of California
  - 291 counties violating 8-hr; 155 of those attain 1-hr; 136 do NOT attain 1-hr

Counties Violating the 8 Hour Ozone Standard 1998-2000



CAA Subpart 1 vs. Subpart 2

- Subpart 1 - general provisions for nonattainment areas
- Subpart 2 - specific requirements for 1-hour ozone non-attainment areas
  - Added in 1990 Clean Air Act Amendments
  - Classification structure
  - Attainment dates vary with severity of problem
  - Mandatory measures

TITLE I –
AIR POLLUTION PREVENTION AND CONTROL

Part D – Plan Requirements for Nonattainment Areas

SUBPART 1 – Nonattainment Areas in General

Sec. 171. Definitions.
Sec. 172. Nonattainment plan provisions.
Sec. 173. Permit requirements.
Sec. 174. Planning procedures.
Sec. 175. Environmental protection agency grants.
Sec. 175A. Maintenance Plans.
Sec. 176. Limitation on certain federal assistance.
Sec. 176A. Interstate Transport Commissions.
Sec. 177. New motor vehicle emission standards in nonattainment areas.
Sec. 178. Guidance documents.
Sec. 179. Sanctions and consequences of failure to attain
Sec. 179B. International border areas

SUBPART 2 – Additional Provisions for Ozone Nonattainment Areas

Sec. 181. Classifications and attainment dates.
Sec. 182. Plan submissions and requirements.
Sec. 183. Federal ozone measures.
Sec. 184. Control of interstate ozone air pollution.
Sec. 185. Enforcement for Severe and Extreme ozone nonattainment areas for failure to attain.
Sec. 185A. Transitional areas.
Sec. 185B. NOx and VOC study.

"Table 1"

Implementation Schedule

- 2001 – States/Tribes made designation recommendations
- 2003 –
  - Propose/prom Imp’n Rule
  - States/Tribes update designation recommendations
- 2004 –
  - Propose/prom designations
- 2007 – SIPs due
- 2007-21 – Attainment dates

GUIDING PRINCIPLES IN DEVELOPING IMPLEMENTATION APPROACH

- Incentives for expeditious attainment … avoid incentives for delay to protect public health
- Provide reasonable attainment deadlines.
- Basic, straightforward structure, communicated easily.
- Consistent with CAA and Supreme Court decision, provide flexibility to states and EPA on implementation approaches and control measures

GUIDING PRINCIPLES (cont)

- National and regional measures for attainment and, where possible, reduce need for more expensive local controls
- Smooth transition from 1-hr O3 NAAQS to 8-hr O3 NAAQS implementation
- Provide opportunities for public input prior to publishing proposal

Implementation Issues

- Greater geographic area of 8-hr standard
- Classifications
  - Boundary considerations
- Attainment dates
- Attainment SIP due dates
- Transition and anti-backsliding

Implementation Issues (cont)

- Mandatory Measures, Subpart 2
  - E.g. Reasonable Further Progress,
  - New Source Review Offset Req’ts, etc
- Modeling & attainment demonstrations
  - Factoring transport
- Optimal controls for ozone, PM2.5 & regional haze
- Conformity

Classification Challenge

- Retain the classification names (marginal, moderate…)
- Adapt the Design Values for the 1-hr standard (Table 1) to the new 8-hr standard

SIP Submittal Due Dates (CAA)

- SIP submittal date and the year of attainment is connected to classification
- In general, a higher classification gets longer to submit a SIP and longer to attain the standard

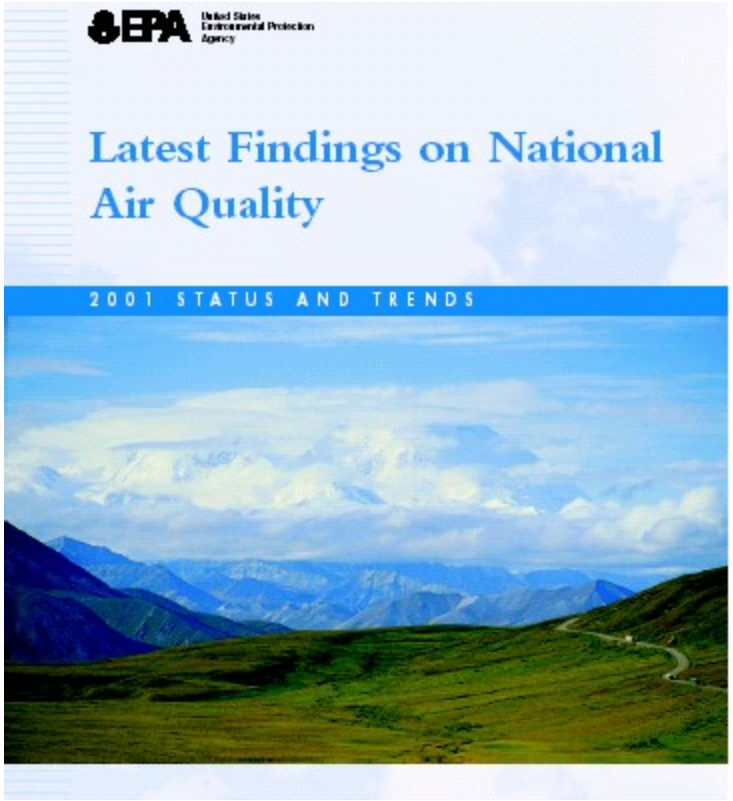
Transition - Anti-Backsliding

- Anti-backsliding provisions ensure control strategies in 1-hour ozone SIPs remain “whole”

Transport

- Transport issue comes in with classifications, attainment demonstrations and regional vs. local control strategies
- EPA drafting Transport Rule, to be final about 2005

Further Reading…



Websites

- www.epa.gov/
- …ttn/naaqs/ozone/ozonetech/o3imp8hr
  - Implementation
- …oar/oaqps
  - EPA Off of Air Qual Plan’g, Standards
- …airmarkets
  - Trading programs
- …air/visibility
  - Visibility
- STAPPA/ALAPCO (non-EPA)
  - www.4cleanair.org/members/committee/criteriadocs.html

Summary

- State/Tribal update to recommendations due 2003
- 8-hour ozone non-attainment areas designated in 2004
- Attainment in 2007-2021
- Questions??